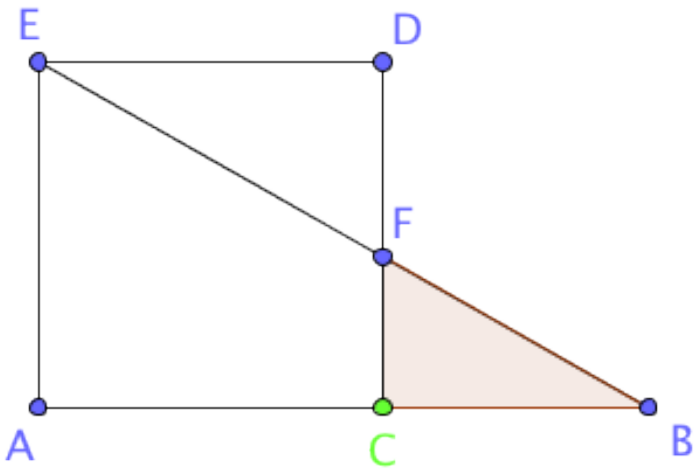
Student Investigation Sheet
Maximizing Area Task

Name: _____
Name: _____

Overview: Today, you will consider the following task in significant detail.



Point C lies on segment AB. As C moves, the side length of square ACDE changes and the area of right triangle BCF changes.

At what point along AB should C be placed to make the area of triangle BCF as large as possible?

Part I: Visualization

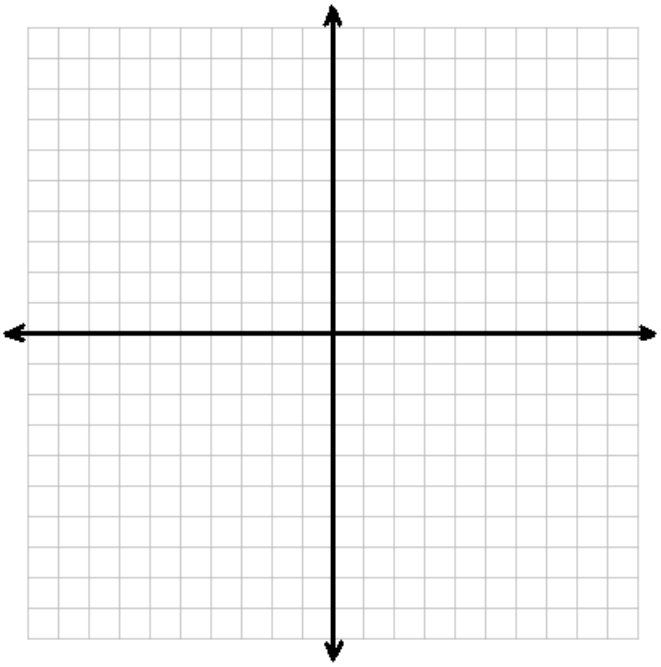
1. *Using only your mind,* visualize what happens to the area of triangle BCF as C moves closer to point B. Describe the change in the area of BCF in words below. Using mathematically appropriate language, explain why you feel this will happen.

2. *Using only your mind,* visualize what happens to the area of triangle BCF as C moves closer to point A. Describe the change in the area of BCF in words below. Using mathematically appropriate language, explain why you feel this will happen.

Part 2: Instrumentation

Explore the interactive sketch of the triangle task found at the following website: http://tinyurl.com/problem43
Using tke sketch, compare your predictions in Part I of this worksheet to what you see on your computer screen.

3. By dragging C and observing changing values of length EC and area BCF, predict what the graph of area BCF with respect to length EC will look like. Draw your prediction below.



4. How does the area of triangle BCF change in the sketch as C moves closer to point A? Did this result surprise you? Why or why not?

5. How does the area of triangle BCF change in the sketch as C moves closer to point A? Did this result surprise you? Why or why not?

6. Click on the "Show Measurements" checkbox in the sketch. What location of the green point (the "Drag Me" point) appears to generate the largest area of triangle BCF? The smallest area of BCF?

Part 3: Tracing

Explore the interactive sketch of the triangle task found at the following website: http://tinyurl.com/problem43 *Using tke sketch,* compare your predictions in Part 2 of this worksheet to what you see on your computer screen.

7. Click on the "Show Plotted Point" and "Show Trace" checkboxes in the sketch. Drag point C and observe how the length EC and area BCF change together. How did your prediction of the graph of area BCF with respect to length EC compare to the actual graph?

Comment in several complete sentences.

Part 4: Algebratize (Building an Algebraic Model)

Explore the interactive sketch of the triangle task found at the following website: http://tinyurl.com/problem43 *Using tke sketch,* construct a function, f(x) = A, that describes the area of triangle BCF (i.e., A) in terms of length EC (i.e., x).

8. Show all work below, explaining your logic and your thought processes clearly. Once you have a possible solution, check it by graphing the model in GeoGebra (enter the expression into the command line). If the trace of your model doesn't match, continue looking for suitable models. Once your model appears to be correct, print out a graph of the model superimposed on plotted data and staple to this sheet.